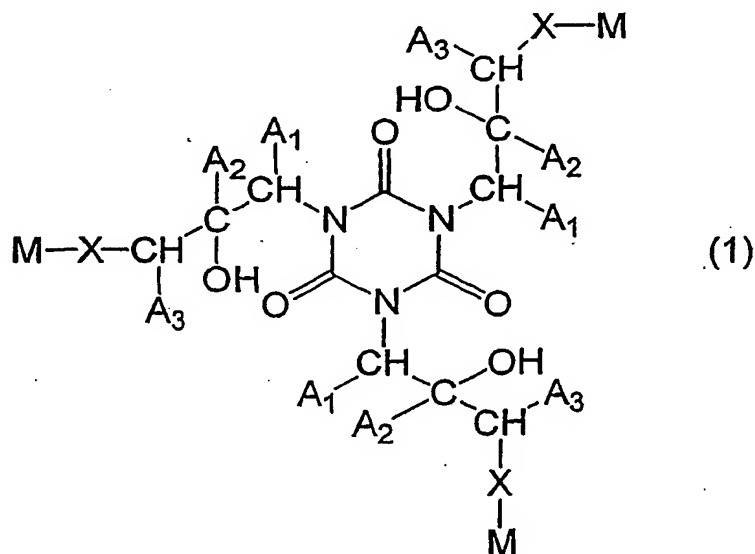


## CLAIMS

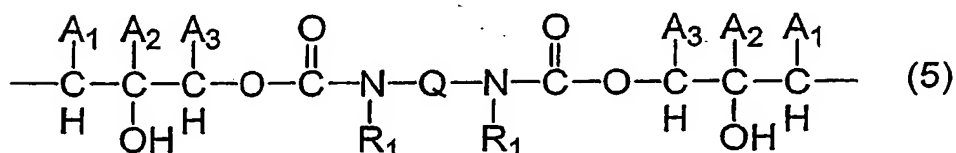
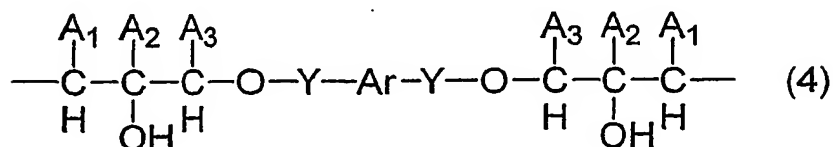
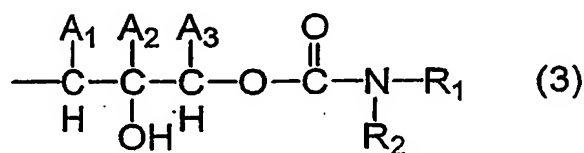
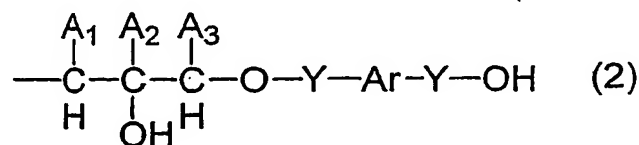
1. A composition for forming anti-reflective coating characterized in that the composition comprises a triazine trione compound having hydroxyalkyl structure as substituent on nitrogen atom, a triazine trione oligomer compound having hydroxyalkyl structure as substituent on nitrogen atom, or a triazine trione polymer compound having hydroxyalkyl structure as substituent on nitrogen atom.
2. The composition for forming anti-reflective coating according to claim 1, wherein the triazine trione compound having hydroxyalkyl structure as substituent on nitrogen atom is a compound of formula (1):



wherein  $A_1$ ,  $A_2$  and  $A_3$  are independently of one another hydrogen atom, methyl or ethyl, X is  $-\text{OC}(=\text{O})-$ ,  $-\text{S}-$ ,  $-\text{O}-$  or  $-\text{NR}-$  wherein R is hydrogen atom or methyl, M is benzene ring, naphthalene ring or anthracene ring which may be substituted with  $\text{C}_{1-6}$  alkyl, phenyl, naphthyl, halogen atom,  $\text{C}_{1-6}$  alkoxy, carbonyl, nitro, cyano,  $\text{C}_{1-6}$  alkoxy or  $\text{C}_{1-6}$  alkylthio.

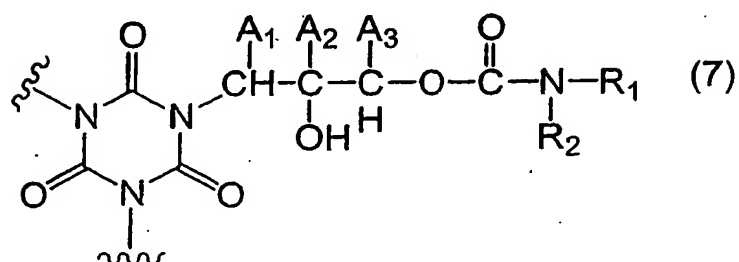
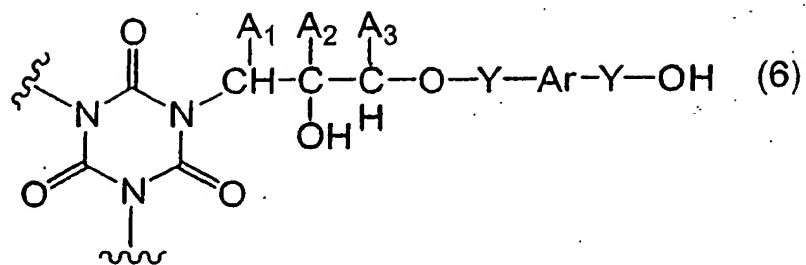
3. The composition for forming anti-reflective coating according to claim 1, wherein the triazine trione compound having hydroxyalkyl structure as substituent on nitrogen atom, the triazine trione oligomer compound having hydroxyalkyl structure as substituent on nitrogen atom, or the triazine trione polymer compound having

hydroxyalkyl structure as substituent on nitrogen atom is a triazine trione compound having a substituent of formula (2) or (3) as substituent on nitrogen atom, or a triazine trione oligomer compound or triazine trione polymer compound having a structure in which at least two triazine trione rings are linked through a linking group of formula (4) or (5) on the nitrogen atoms:



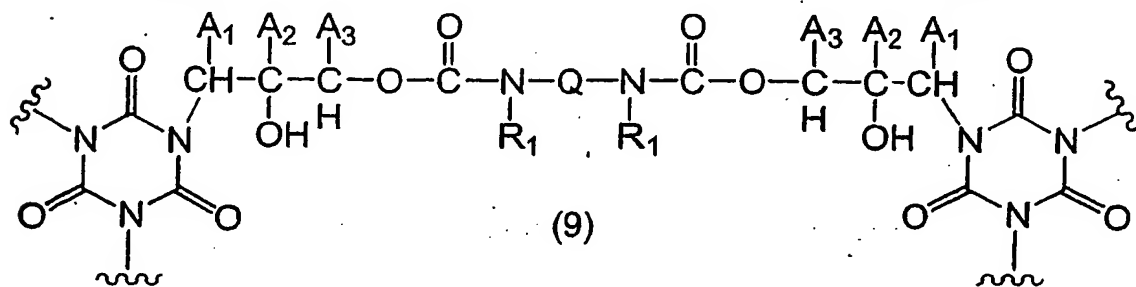
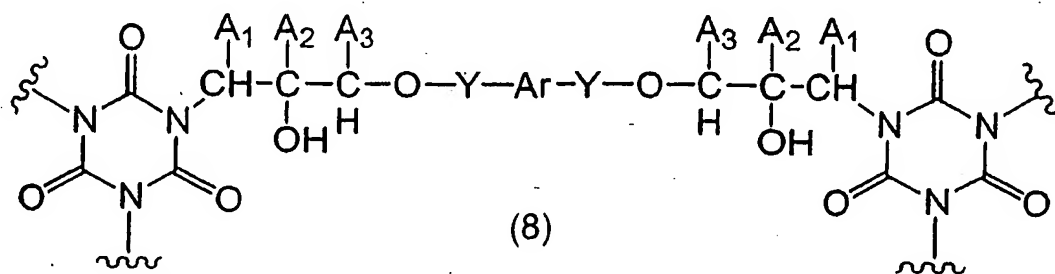
wherein A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> have the same meaning as that in claim 2, Y is a direct bond or -C(=O)-, Ar is benzene ring or naphthalene ring which may be substituted with C<sub>1-6</sub> alkyl, phenyl, naphthyl, halogen atom, C<sub>1-6</sub> alkoxy, carbonyl, nitro, carboxy, cyano, C<sub>1-6</sub> alkoxy, hydroxy, thiol, C<sub>1-6</sub> alkylthio or amino, Q is C<sub>1-6</sub> alkyl, C<sub>5-8</sub> cycloalkyl, Ar or -CH<sub>2</sub>-Ar-CH<sub>2</sub>-, R<sub>1</sub> is C<sub>1-6</sub> alkyl, phenyl or benzyl, R<sub>2</sub> is hydrogen atom, C<sub>1-6</sub> alkyl, phenyl or benzyl.

4. The composition for forming anti-reflective coating according to claim 3, wherein the triazine trione compound having a substituent of formula (2) or (3) has a structure of formula (6) or (7):



wherein A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, Y, Ar, R<sub>1</sub> and R<sub>2</sub> have the same meaning as that in claim 3.

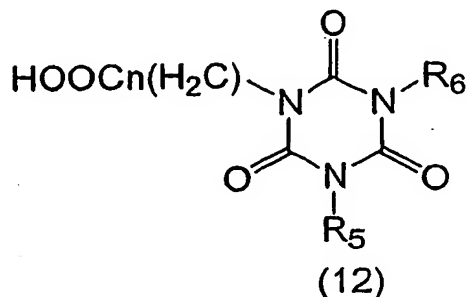
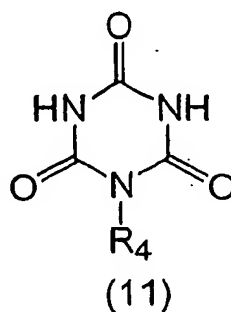
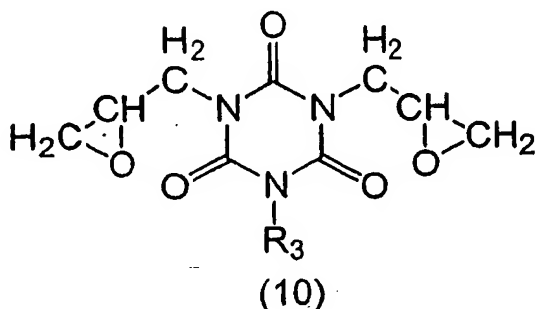
5. The composition for forming anti-reflective coating according to claim 3, wherein the triazine trione oligomer compound or triazine trione polymer compound having a structure in which at least two triazine trione rings are linked through a linking group of formula (4) or (5) on the nitrogen atoms has a structure of formula (8) or (9):



wherein A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, Y, Ar, Q, R<sub>1</sub> and R<sub>2</sub> have the same meaning mentioned as that in

claim 3.

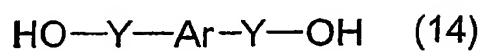
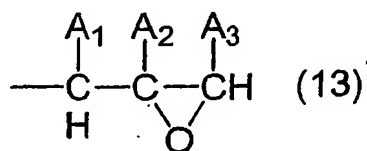
6. The composition for forming anti-reflective coating according to claim 1, wherein the triazine trione oligomer compound having hydroxyalkyl structure as substituent on nitrogen atom, or triazine trione polymer compound having hydroxyalkyl structure as substituent on nitrogen atom is a reaction product of a compound of formula (10) with a compound of formula (11) or (12):



wherein  $R_3$  is  $C_{1-6}$  alkyl,  $C_{3-6}$  alkenyl, phenyl, benzyl or 2,3-epoxypropyl,  $R_4$  and  $R_5$  are  $C_{1-6}$  alkyl,  $C_{3-6}$  alkenyl, phenyl or benzyl,  $R_6$  is  $C_{1-6}$  alkyl, phenyl, benzyl or  $-(CH_2)_nCOOH$ , and  $n$  is a number of 1, 2 or 3.

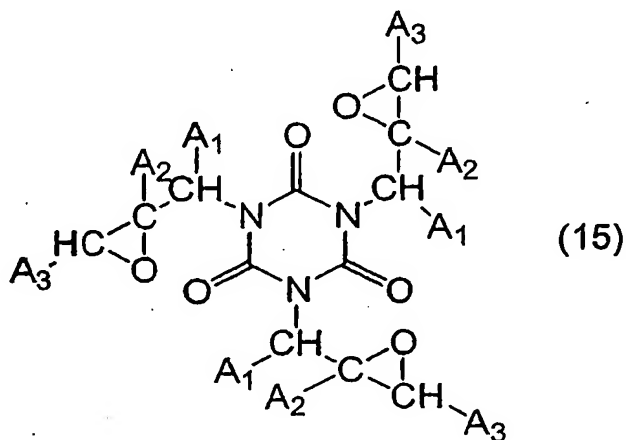
7. The composition for forming anti-reflective coating according to claim 3, wherein the triazine trione compound having a substituent of formula (2) as substituent on nitrogen atom, or the triazine trione oligomer compound or triazine trione polymer compound having a structure in which at least two triazine trione rings are linked through a linking group of formula (4) on the nitrogen atoms is produced from a triazine trione compound having at least two nitrogen atoms having a substituent of

formula (13) on nitrogen atom and a phenyl compound or naphthalene compound of formula (14) having at least two substituents selected from carboxy and hydroxy which are identical or different from each other.



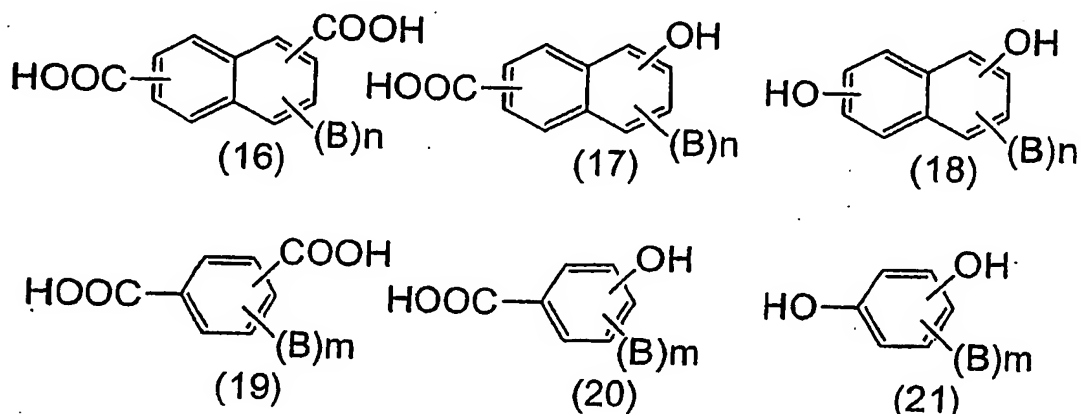
in formula (13), A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> have the same meaning as that in claim 3, and in formula (14), Y and Ar have the same meaning as that in claim 3.

8. The composition for forming anti-reflective coating according to claim 7, wherein triazine trione compound having at least two nitrogen atoms having a substituent of formula (13) on nitrogen atom is a triazine trione compound of formula (15)



wherein A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> have the same meaning as that in claim 3.

9. The composition for forming anti-reflective coating according to claim 7, wherein the phenyl compound or naphthalene compound of formula (14) is at least one compound selected from the group consisting of compounds of formulae (16) to (21)



wherein B is hydrogen atom, C<sub>1-6</sub> alkyl, phenyl, naphthyl, halogen atom, C<sub>1-6</sub> alkoxy, carbonyl, nitro, carboxy, cyano, C<sub>1-6</sub> alkoxy, hydroxy, thiol, C<sub>1-6</sub> alkylthio or amino, n is a number of 1 to 6, m is a number of 1 to 4, and B may be identical with or different from each other in case where n or m is 2 or more.

10. The composition for forming anti-reflective coating according to any one of claims 1 to 9, further containing a crosslinking agent having at least two crosslink-forming substituents.

11. The composition for forming anti-reflective coating according to any one of claims 1 to 10, further containing an acid and/or an acid generator.

12. The composition for forming anti-reflective coating according to any one of claims 1 to 11, further containing a resin having at least one crosslinking-forming substituent selected from hydroxy, carboxy, amino and thiol.

13. An anti-reflective coating produced by coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a semiconductor substrate, and baking it, wherein the anti-reflective coating has an attenuation

coefficient  $k$  to a light at a wavelength of 248 nm ranging from 0.40 to 0.65.

14. An anti-reflective coating produced by coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a semiconductor substrate, and baking it, wherein the anti-reflective coating has an attenuation coefficient  $k$  to a light at a wavelength of 157 nm ranging from 0.20 to 0.50.

15. An anti-reflective coating produced by coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a semiconductor substrate, and baking it, wherein the anti-reflective coating has an attenuation coefficient  $k$  to a light at a wavelength of 193 nm ranging from 0.20 to 0.60.

16. A method of forming an anti-reflective coating for use in a manufacture of a semiconductor device, comprising the steps of: coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a substrate, and baking it.

17. A method of forming an anti-reflective coating for use in a manufacture of a semiconductor device by use of a light of wavelength 248 nm, 193 nm or 157 nm, comprising the steps of: coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a substrate, and baking it.

18. A method of forming a photoresist pattern for use in a manufacture of a semiconductor device comprising the steps of:

- coating the composition for forming anti-reflective coating according to any one of claims 1 to 12 on a semiconductor substrate and baking it to form an anti-reflective coating,

- forming a photoresist layer on the anti-reflective coating,

- exposing the semiconductor substrate covered with the anti-reflective coating and the photoresist layer with a light, and

- developing the exposed photoresist layer.

19. The method of forming a photoresist pattern according to claim 18, wherein the exposure is carried out with a light of wavelength 248 nm, 193 nm or 157 nm.